

## UNMANNED AERIAL VEHICLES FOR COLLABORATION

### FIELD

[0001] This document relates, generally, to a telepresence device.

### BACKGROUND

[0002] Telepresence systems may allow a first user at a first, remote location to interface with a second user at a second location, allowing the remote user to feel as if they are present, at the same location as that of the second user. Current telepresence solutions, such as those provided by commercial video teleconferencing systems, may provide multiple users with the ability to interface electronically, using both audio and video feeds. However, this typically involves each of the users being present in an established teleconferencing facility at a fixed location.

### SUMMARY

[0003] In one aspect, a mobile telepresence system, in accordance with embodiments as broadly described herein may include a frame, including a central body defining a longitudinal axis of the frame, a first arm at a first end portion of the central body and a second arm at a second end portion of the central body, opposite the first end portion of the central body, a propulsion system operably coupled to the frame and configured to propel the frame in response to an external command, a screen movably coupled to the first arm, and an image output device coupled to the frame

[0004] In another aspect, a mobile telepresence system, in accordance with embodiments as broadly described herein, may include a frame, including a forward arm, an aft arm and a central body extending from a central portion of the forward arm to a central portion of the aft arm, the central body defining a longitudinal axis of the frame, a plurality of rotors operably coupled to the frame and configured to propel the frame in response to an external command, a screen movably coupled to the first arm, an output device operably coupled to the frame and configured to project an image onto the screen, and a controller including a communication module configured to receive signals from the second location and transmit signals to the second location.

[0005] The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is an example of an implementation of a mobile telepresence system, in accordance with embodiments as broadly described herein.

[0007] FIG. 2 is a perspective view of a mobile telepresence system, in accordance with embodiments as broadly described herein.

[0008] FIGS. 3A-3C illustrate a hinged coupling of a screen and a frame of the example quadcopter shown in FIG. 1B, in which FIG. 3A is a side view, FIG. 3B is a rear perspective view, and FIG. 3C is a front perspective view of the hinged coupling of the screen to the frame of the quadcopter, in accordance with embodiments as broadly described herein.

[0009] FIGS. 4A-4C are side views of orientation angles of a screen relative to a frame of the example quadcopter shown in FIG. 2, in accordance with embodiments as broadly described herein.

[0010] FIGS. 5A-5D illustrate various orientation angles of a screen relative to a frame of the example quadcopter shown in FIG. 2, in accordance with embodiments as broadly described herein.

[0011] FIG. 6A is a perspective view, and FIGS. 6B-6D are side views, of a screen of the example quadcopter shown in FIG. 2, in accordance with embodiments as broadly described herein.

[0012] FIGS. 7A and 7B illustrate projection of an image onto a screen of the example quadcopter shown in FIG. 2, in accordance with embodiments as broadly described herein.

[0013] FIG. 8 is a side view of a coupling for a screen and an image output device to a frame of a quadcopter, in accordance with embodiments as broadly described herein.

[0014] FIG. 9 is a perspective view of a mobile telepresence system, in accordance with embodiments as broadly described herein.

[0015] FIGS. 10A-10B are side views of a mobile telepresence system, in accordance with embodiments as broadly described herein.

[0016] FIG. 11 is a block diagram of a mobile telepresence system, in accordance with embodiments as broadly described herein.

### DETAILED DESCRIPTION

[0017] Telepresence systems may provide a remote user with the ability to feel fully present and engaged with one or more participants at another location, physically separate from the location of the remote user. For example, in the case of a meeting held in a designated location, such as, for example, a conference room, a remote user of a telepresence system may be able to interact and engage with the participants in the conference room, from the remote location, including two way audio communication capability and/or two way video communication capability, without being physically in the conference room. A video teleconferencing facility may provide the capability for two way audio and/or video communication between the remote user and the participants in the conference room. However, this may require that the conference room and the remote location be equipped with video teleconferencing equipment, which may be at a fixed location and thus not mobile, which may be relatively expensive to implement and maintain, and which may impact the flexibility of the space in which the equipment is installed. This may somewhat limit the ability of the remote user and the other participants of the meeting in scheduling and conducting meetings.

[0018] In some embodiments, a mobile component may provide an additional level of flexibility to a telepresence system, allowing the telepresence system to be moved into and around a plurality of different designated locations as necessary. For example, in one implementation, a mobile telepresence system may be included on a robot which may be remotely navigated by a user, for example, throughout spaces in a work place. Such a telepresence robot may be remotely navigated, for example, through corridors, into and out of offices, conference rooms and other work spaces, and the like. However, the size and energy consumption levels of this type of telepresence robot may hinder its ability to effectively navigate complicated spaces with limited open